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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/702,074	10/30/2000	Yi Liu	100969-147	9095

7590 08/28/2002  
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EXAMINER

MARTIR, LILYBETT

ART UNIT	PAPER NUMBER
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2855

DATE MAILED: 08/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/702,074

Applicant(s)

LIU, YI

Examiner

Lilybett Martir

Art Unit

2855

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 May 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 30 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 13 May 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 6) ☐ Other:

## DETAILED ACTION

### *Drawings*

Figure 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shen et al. (Pat. 6,293,156) in view of Bruner (Pat. 4,528,857). Shen et al. teaches the claimed invention, including:

- A first transmitter receiver pair as in elements 112 and 122 secured to define a first ultrasonic signal path across the fluid V flowing in the conduit as noted in Figure 8; a second transmitter receiver pair as in elements 114 and 124 configured to define a second ultrasonic path across fluid flowing in the conduit as noted in Figure 8; and a processor as in element DSP (Col. 2, lines 20-31) operative to correlate a tag-modulated output signal of said first pair with a tag-modulated output signal of said second pair to

determine a time interval representative of flow (See abstract), as in claim 1.

- Said first pair operating at a different frequency than said second pair (Col. 8, lines 11-12), as in claim 2.
- Operating in a frequency range above 100 Kilohertz (Col. 2, lines 25-31), as in claim 3.
- Said frequency range lying above approximately 900 Kilohertz (Col. 8, lines 18-20), as in claim 4.
- The first pair operating at a frequency different than frequency of operation of said second pair (Col. 8, lines 10-11), and received signals being demodulated (Col. 8, lines 25-28), as in claim 5.
- Said first pair as in elements 112 and 122 said second pair as in elements 122 and 124 operate in a continuous mode (as noted in Figures 2 and 9, by way of the loop-circuits shown, Col. 4, lines 50-53), as in claim 7.
- First and second transmitter receiver pairs as in elements 112, 122, 114 and 124 defining first and second transit paths across a conduit as noted in Figure 8, a signal processor for processing signals received along said first and second paths as in element DSP; and a correlator for determining a time interval between correlated tag modulated signals on said first and second paths (Col. 6, lines 20-31, See Abstract), as in claim 8.
- At least one of the transducers attached to a conduit by clamp-on (Col. 3, lines 56-57), as in claims 12 and 15.

- Providing a first transmitter/receiver pair defining a first signal path through fluid in the pipe such that a first receiver output is modulated by tags in the fluid, providing a second transmitter/receiver pair defining a second signal path through fluid in the pipe such that a second receiver output is modulated by tags in the fluid, and correlating the second receiver output with the first receiver output to determine flow rate (Col. 5, lines 11-29), as in claim 13.
- Operating the first transmitter/receiver pair 112 and 122 at a first frequency and operating the second transmitter/receiver pair 114 and 124 at a second frequency different from the first frequency (Col. 8, lines 11-12), wherein the first frequency is sufficiently high to be well modulated by the tags, and the second frequency is close to the first frequency (Col. 8, lines 13-18), as in claim 14.

But he does not disclose:

- The second transmitter receiver pair being mounted so that the second path is anti-parallel to the first path and spaced a fixed distance there from (Col. 3, lines 25-28); as in claims 1, 8 and 13.
- Said transducers being coupled to a team pipe of a building heating system, as in claim 9.
- Said transducers being attached to a process feed gas pipe of a chemical plant, as in claim 10.

- A conduit having a nominal diameter of under about two inches, as in claim 11.

Bruner teaches an ultrasonic flowmeter in which the transmitting transducers 24 and 28 are mounted in a conduit 12 to transmit ultrasonic beams in anti-parallel directions to the receiving transducers 26 and 30 (Col. 3, lines 33-36).

Since it has been held that rearranging parts of an invention involves only routine skill in the art; *In re Japikse*, 86 USPQ 70; it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the teachings of the flow measurement system of Shen et al. using the teachings of the ultrasonic flowmeter of Bruner by re-arranging the transducers/receiver in order for them to be mounted to transmit ultrasonic beams in anti-parallel directions for the purpose of reducing the sensitivity of the flowmeter to temperature or pressure inhomogeneities therefore making said system more accurate and reliable. Also, since it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations, *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987); it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify either the flow measurement system of Shen et al. or the ultrasonic flowmeter of Bruner by coupling them to either the pipe of a building heating system or to a process feed gas pipe of a chemical plant for the purpose of measuring the flow of a fluid in a particular kind of pipe, therefore making said device versatile. And since such a modification would have involved a mere change in the size

of a component and a change in size is generally recognized as being within the level of ordinary skill in the art; In re Rose, 105 USPQ 237 (CCPA 1955); it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the teachings of either the flow measurement system of Shen et al. or the ultrasonic flowmeter of Bruner by attaching it to a pipe or conduit having a nominal diameter of about two inches for the purpose of making said device versatile.

### ***Citation of Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art considered pertinent during examination of the examined application is:

- Sheen et al. (Pat. 4,598,593) Acoustic cross-correlation flowmeter for solid-gas flow. The whole document.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection. Applicants arguments have been fully addressed by the above presented rejection.

### ***Conclusion***

Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on January 9, 2002 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609(B)(2)(i). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lilybett Martir whose telephone number is (703)305-6900. The examiner can normally be reached on 8:30 AM to 5:00 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Fuller can be reached on (703)308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3432 for regular communications and (703)305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.



Lilybett Martir  
Examiner  
Art Unit 2855

  
August 13, 2002

  
Benjamin R. Fuller  
Supervisory Patent Examiner  
Technology Center 2800